Small Business Innovation Research/Small Business Tech Transfer

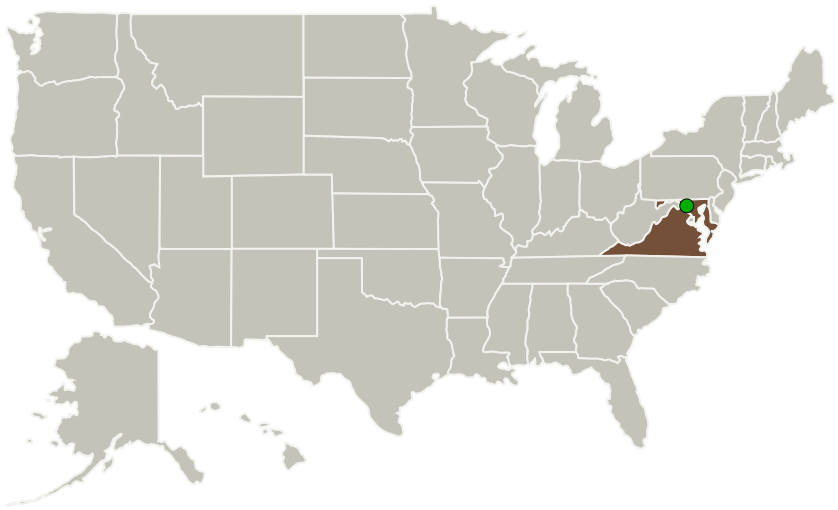
An Interactive Visual Analytics Tool for NASA's General Mission Analysis Tool, Phase I

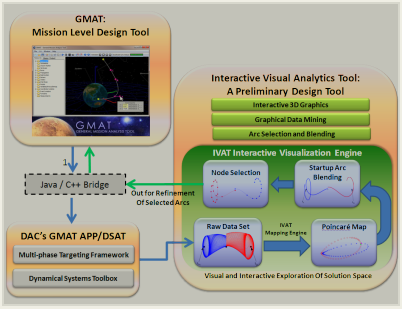
Completed Technology Project (2014 - 2014)

Project Introduction

The goal of any spacecraft trajectory design process is to identify a path that transfers a vehicle from its point of origin to some specific destination in the presence of path and mission level constraints. From the mission designer perspective, this process is divided into two primary tasks: (a) the identification of candidate startup arcs, and (b) the subsequent refinement of those solutions, via targeting or optimization processes, to meet some pre-defined mission requirements. The work proposed here seeks to address the first aspect directly, while addressing the second indirectly, using NASA's General Mission Analysis Tool (GMAT) as the underlying demonstration platform. Phase I of this effort is focused on developing a prototype for an Interactive Visual Analytics Tool (IVAT) for GMAT. The goal of the IVAT module is to provide a modern, interactive, preliminary design tool that allows analysts to more efficiently explore and mine the space of candidate solutions prior to selecting a specific mission for the refinement phase. The development leverages GMAT's Advanced Path Planning (APP) and Dynamical Systems Analysis Toolbox (DSAT), developed by DECISIVE ANALYTICS Corporation (DAC). IVAT is envisioned as a preliminary design tool that can be readily integrated with gradient based optimal or sub-optimal refinement tools, such as but not limited to those provided by GMAT. However, for this effort we focus on GMAT as our selected technology demonstration platform.

Primary U.S. Work Locations and Key Partners





An Interactive Visual Analytics Tool for NASA's General Mission Analysis Tool Project Image

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Organizations Performing Work	Role	Type	Location
Decisive Analytics Corporation	Lead Organization	Industry	Arlington, Virginia
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	Virginia

Project Transitions

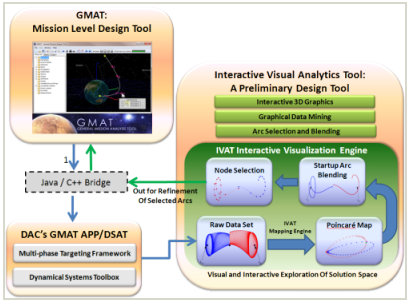
June 2014: Project Start

December 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137714)*

Images



Project Image
An Interactive Visual Analytics Tool for NASA's General Mission Analysis Tool Project Image *(https://techport.nasa.gov/image/132937)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Decisive Analytics Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

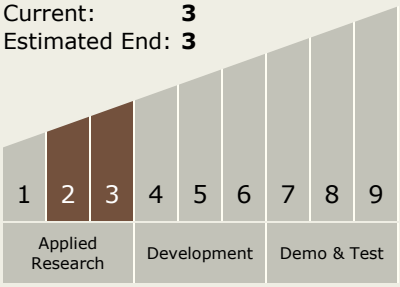
Carlos Torrez

Principal Investigator:

Belinda G Marchand

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
  - TX11.1 Software Development, Engineering, and Integrity
    - TX11.1.8 Software Analysis and Design Tools

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System